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SANTA BARBARA • SANTA CRUZ

TELEPHONE: (510) 642-2880
TELEFAX: (510) 642-5687
E-MAIL: hansen@ce.berkeley.edu

MARK HANSEN
DEPARTMENT OF CIVIL & ENVIRONMENTAL ENGINEERING
107 MCLAUGHLIN HALL
BERKELEY, CALIFORNIA 94720-1712

NASA Software of the Year Award Evaluation Committee
National Aeronautics and Space Administration
Ames Research Center
Moffett Field, CA 94035-1000

Members of the Evaluation Committee:

I am pleased to write in support of FACET for NASA Software of the Year. Several members of my research team have used this software in their work, and I am continually amazed at the range of applications—some no doubt unanticipated by the developers—for which it is not only useful but better suited than any other software product that I know of.

Over the past several years, the role of this software has shifted from merely a tool for accomplishing research to a shaper of my research agenda. Knowing that FACET is available allows me to propose research I would otherwise be unable (or at least disinclined) to perform. I think that this has become true throughout much of the aviation research community. As the tool becomes embedded like this, it becomes far too easy to take it for granted. I am therefore grateful for the opportunity to reflect on the value and importance of FACET afforded by this letter.

While I personally have used FACET some, most of the frontline use is by my students. I asked two of them to comment on the value of this software. One of them, who has substantial experience with aviation simulation, writes:

> FACET is the best airspace simulation software that I have ever used. The friendly graphical user interface makes it easy to use. It has an exhaustively detailed help menu, in which each topic is well explained and can be easily accessed. Moreover, it is open software and gives detailed explanation of its large inventory of outputs. The function of the software is very strong and complete. The most important feature is that this software runs very fast, even for a complex simulation situation, which enables it to be a potential real time decision support tool for the NAS.

According to a second student:

> FACET has a "playback" mode in which it can replay pre-recorded ETMS data. This provides a useful tool for post analysis of Air Traffic Management (ATM) decisions. In our research, we used FACET to run ETMS data for some selected days in August 2002, and obtained the time varying sector occupancy for various sectors in the Cleveland and New York Centers. We compared those numbers with a similar metric obtained from the results of an optimization model for ATM, and analyzed the missed opportunities that could have been the cause of certain amount of *avoidable delay* in the NAS on those days.
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> FACET also provides a platform to visually identify various components in the NAS, such as jet routes, Centers, en route sectors in different altitude levels, waypoints and

fixes, airports, etc. The in-built data, which is derived from the standard FAA database, provides a source to identify various preferred routes (or termed as Coded Departure Routes) between different airports.

Finally, a third student reports:

> FACET is an impressive National Airspace System simulation tool. It is extremely versatile, in that it can easily be used for diverse purposes and at diverse levels of technicality. Its playback function enabled us to evaluate flow control strategies that were devised from actual data from January 2005. It also provides optimization functionalities and can be used as a stand-alone decision-support tool for traffic flow management.
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> FACET not only is a powerful technical tool, but it also provides exceptional graphical analyses of its results. This greatly facilitates the presentation of research conducted using FACET.
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> The software is extremely reliable, and I have not seen it crash in one year of intensive use. It is easy to use and all functions are implemented using intuitive graphical user interfaces.
>
> It contains a very complete data set of the National Airspace System, in terms of sector boundaries, center boundaries, jetways, etc. Having this data assembled in one tool allows us to concentrate on the research portion of our project and saves us a tremendous amount of time.

Like most great software tools, FACET succeeds because it is based on a sound and simple concept and because the concept is executed with care and skill. The way it works is refreshingly transparent and ideal for a research environment where our aim is to use the software to bolster our own creativity, rather than suppress it with complicated black-box algorithms that are time-consuming to learn how to use and of dubious reliability. I would estimate that about half of my research program would be either severely affected of rendered infeasible were FACET not available.

In sum, I heartily endorse FACET for NASA Software of the Year. As an academic, I represent just one of the many communities where FACET has found widespread application. Knowing that it is also used extensively by FAA, the airlines, and NASA itself only increases my admiration for the team that conceived and created this product.

Sincerely,

Mark Hansen
Professor of Civil and Environmental Engineering
Co-Director, National Center of Excellence in Aviation Operations Research
University of California, Berkeley